

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/J/P/04-2118

### **Amendments to the Claims:**

This listing of claims replaces all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1-12. (Cancelled)

13. (Original) A system for allocating bandwidth comprising:

a plurality of queues, each of the plurality of queues being associated with a quality of service and having a corresponding quantum value, configured to store packets arriving from the network;

an output queue configured to receive packets from the plurality of queues and forward them to a channel;

a bandwidth allocator circuit configured to classify received packets based on quality of service requirements and direct the packets to one of the plurality of queues, the bandwidth allocator circuit further comprising:

a bandwidth differential circuit configured to determine an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

a quantum updating circuit configured to update the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in the plurality of queues for an update period and the quality of service associated with the respective queue.

14. (Original) The system to claim 13, wherein the quantum values correspond to the quality of service associated with the respective queue.

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/J/P/04-2118

15. (Original) The system according to claim 13, wherein bandwidth differential circuit comprises:

a bandwidth calculator circuit configured to calculate the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel and the difference between the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel.

16. (Original) The system according to claim 15, wherein the bandwidth calculator circuit is further configured to calculate the total amount of committed bandwidth on the downstream channel based on a total amount of bandwidth committed to voice traffic, data traffic and signaling traffic.

17. (Original) The system according to claim 13, wherein the quantum updating circuit comprises:

a quantum calculator circuit configured to calculate the total reserved quantum value for the update period based on a minimum reserved quantum value of each of the plurality of queues and update the quantum values of each of the plurality of queues by an update quantum value, wherein the update quantum value for each of the plurality of queues comprises:

zero when the available quantum value is less than zero;

the minimum reserved quantum value for the update period plus an excess quantum value for the update period when the available quantum value is larger than the total reserved quantum value; and

the minimum reserved quantum value for the update period minus a deficit quantum value for the update period when the total reserved quantum value is larger than the available quantum value.

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/J/P/04-2118

18. (Original) The system according to claim 17, wherein the excess quantum value and the deficit quantum value correspond to the quality of service associated with the respective queue.

19. (Original) The system according to claim 17, wherein the excess quantum value and the deficit quantum value are proportional to the quality of service associated with the respective queue.

20. (Original) The system according to claim 13 wherein the system is a broadband multiple access system.

21. (Original) The system according to claim 13 wherein the update period is a constant update interval.

22. (Original) A system according to claim 13 wherein the update period is not a constant update interval.

23. (Original) The system according to claim 22, wherein the update period is a current time minus a time of the last update period.

24. (Original) The system according to claim 13, wherein the plurality of queues contain a plurality of packets that are processed using a deficit round robin algorithm.

25-26. (Cancelled)

27. (New) A method for allocating bandwidth in an apparatus having a plurality of input queues configured to store packets arriving from a network and an output queue configured to receive packets from the plurality of input queues and forward them to a channel, said method comprising the steps of:

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/JIP/04-2118

classifying, using a bandwidth allocator circuit, received packets based on quality of service requirements and direct the packets to one of the plurality of input queues, each of the plurality of input queues being associated with a quality of service and having a corresponding quantum value, the bandwidth allocator circuit operative to perform the steps of:

determining, using a bandwidth differential circuit, an available quantum value based on a total amount of committed bandwidth on a downstream channel and a total amount of bandwidth on the downstream channel; and

updating, using a quantum updating circuit, the quantum values of each of the plurality of queues by an update quantum value corresponding to respective ones of the plurality of queues, the update quantum values being based on the available quantum value, a total reserved quantum value corresponding to packets enqueued in the plurality of input queues for an update period and the quality of service associated with the respective queue.

28. (New) The method of claim 27, wherein the quantum values correspond to the quality of service associated with the respective queue.

29. (New) The method according to claim 27, wherein said bandwidth differential circuit further comprises a bandwidth calculator circuit configured to calculate the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel and the difference between the total amount of committed bandwidth on the downstream channel and the total amount of bandwidth on the downstream channel.

30. (New) The method according to claim 29, wherein the bandwidth calculator circuit is further configured to calculate the total amount of committed bandwidth on the downstream channel based on a total amount of bandwidth committed to voice traffic, data traffic and signaling traffic.

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/J/P/04-2118

31. (New) The method according to claim 27, wherein the quantum updating circuit comprises a quantum calculator circuit configured to calculate the total reserved quantum value for the update period based on a minimum reserved quantum value of each of the plurality of queues and update the quantum values of each of the plurality of queues by an update quantum value, wherein the update quantum value for each of the plurality of input queues is:

zero when the available quantum value is less than zero;

the minimum reserved quantum value for the update period plus an excess quantum value for the update period when the available quantum value is larger than the total reserved quantum value; and

the minimum reserved quantum value for the update period minus a deficit quantum value for the update period when the total reserved quantum value is larger than the available quantum value.

32. (New) The method according to claim 31, wherein the excess quantum value and the deficit quantum value correspond to the quality of service associated with the respective queue.

33. (New) The method according to claim 31, wherein the excess quantum value and the deficit quantum value are proportional to the quality of service associated with the respective queue.

34. (New) The method according to claim 27 wherein the system is a broadband multiple access system.

35. (New) The method according to claim 27 wherein the update period is a constant update interval.

36. (New) The method according to claim 27 wherein the update period is not a constant update interval.

Appl. No. 09/759,672  
Amdt. Dated September 20, 2004  
Reply to Office action of June 18, 2004  
Attorney Docket No. P12540-US1  
EUS/J/P/04-2118

37. (New) The method according to claim 36, wherein the update period is a current time minus a time of the last update period.

38. (New) The method according to claim 27, wherein the plurality of queues contain a plurality of packets that are processed using a deficit round robin algorithm.

\* \* \*